

SIEMENS

PATENT
Attorney Docket No. 2001P17947WOUS

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Inventor:	A. Jeutter et al.)	
)	Group Art Unit: 1795
Serial No.:	10/659,219)	
)	Examiner: E. Wong
Filed:	September 10, 2003)	

Title **METHOD FOR COATING A SUBSTRATE HAVING HOLES**

Commissioner For Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

APPELANTS BRIEF

This Appeal Brief relates to the final rejection of claims 1-2, 4-14 and 16-18 in the Final Office Action mailed August 9, 2007.

Real Party in Interest

This application is assigned to Siemens Aktiengesellschaft of Munich, Germany.

Related Appeals and Interferences

There are no prior pending appeals, interferences or judicial proceedings known to Applicants, Applicants legal representatives, or Assignee which may be related to, directly affect or be directly affected by or having a bearing on the Board's decision in this appeal.

Status of Claims

Claims 1-2, 4-14 and 16-18 stand rejected by the Office Action mailed August 9, 2007 and are presently under appeal in this proceeding. Claims 3 and 15 were canceled during prosecution. No other claims stand rejected, allowed, withdrawn, objected to, or canceled.

Status of Amendments

An amendment after final under 37 CFR § 1.116 was submitted on October 9, 2007 and a supplemental amendment after final under 37 CFR § 1.116 was submitted on October 31, 2007. The Advisory Action dated November 6, 2007 stated that the supplemental amendment after final will be entered.

Summary of Claimed Subject Matter

Independent claim 1:

Referring to Figure 1, independent claim 1 recites a method for coating a substrate 1 having at least one hole 4 (e.g. page 3 lines 11-13), comprising:

covering the at least one hole 4 with a plug 16 (e.g. page 3 lines 21-22);

applying at least one layer 13 to a surface 3 of the substrate 1 via a low-temperature coating process (e.g. page 3 lines 24-26); and

irradiating a near-surface region 15 of the coating layer 13 to improve adhesion of the coating layer 13 to the substrate 1, and to ensure homogenization of the coating layer 13 (e.g. page 4 line 31 to page 5 line 3) without homogenizing a region of the substrate 1 located laterally adjacent the homogenized region (e.g. figures 1c and 1d).

Dependant Claim 2:

Referring to Figure 1, dependant claim 2 recites a method according to claim 1, wherein the substrate **1** is a turbine blade (e.g. page 3 lines 11-12).

Dependant Claim 3:

Referring to Figure 1, dependant claim 4 recites a method according to claim 1, wherein the low-temperature coating process is an electrochemical coating method (e.g. page 4 lines 11-12).

Dependant Claim 5:

Referring to Figure 1, dependant claim 5 recites a method according to claim 1, wherein the temperature for the low-temperature coating process is below 250°C (e.g. page 4 lines 13-15).

Dependant Claim 6:

Referring to Figure 1, dependant claim 6 recites a method according to claim 1, wherein irradiation of the near-surface region **15** is performed using pulsed electron irradiation (e.g. page 5 lines 3-4).

Dependant Claim 7:

Referring to Figure 1, dependant claim 7 recites a method according to claim 1, wherein irradiation of the near-surface region is performed using a laser treatment (e.g. page 5 lines 3-4).

Dependant Claim 8:

Referring to Figure 1, dependant claim 8 recites a method according to claim 1, wherein during or at the end of irradiation of the near-surface region **15**, the plug **16** is removed from the near-surface region of the hole **4** (e.g. page 5 lines 9-13).

Dependant Claim 9:

Referring to Figure 1, dependant claim 9 recites a method according to claim 8, wherein the plug **16** is removed by evaporation (e.g. page 5 lines 9-13).

Dependant Claim 10:

Referring to Figure 1, dependant claim 10 recites method according to claim 1, wherein the coating layer 13 is a ceramic heat insulating layer, or an MCrAl_y coating where M is selected from the group consisting of iron, cobalt and nickel (e.g. page 5 lines 18-19).

Dependant Claim 11:

Referring to Figure 1, dependant claim 11 recites a method according to claim 1, wherein the hole 4, of which there is at least one, is a film cooling hole or an impingement cooling hole (e.g. page 3 lines 13-18).

Dependant Claim 12:

Referring to Figure 1, dependant claim 12 recites a method according to claim 1, wherein the plug 16 is a wax material (e.g. page 3 lines 28-31).

Independent claim 13:

Referring to Figure 1, independent claim 13 recites a method for coating a turbine component 1 having at least one hole 4 (e.g. page 3 lines 11-13), comprising:

covering the at least one hole 4 with a plug 16 (e.g. page 3 lines 21-22);

applying at least one layer 13 to a surface 3 of the turbine component 1 via a low-temperature coating process (e.g. page 3 lines 24-26); and

irradiating a near-surface region 15 of the coating layer 13 to improve adhesion of the coating layer 13 to the surface 3 of the component 1, and to ensure homogenization of the coating layer 13 (e.g. page 4 line 31 to page 5 line 3) and without homogenizing a region of the surface 3 of the turbine component 1 located laterally adjacent the homogenized region (e.g. figures 1c and 1d).

Independent claim 14:

Referring to Figure 1, independent claim 14 recites a method for recoating a substrate 1, which has already been used (e.g. page 5 lines 21-22) and having at least one hole 4 (e.g. page 3 line 13), comprising:

covering the at least one hole 4 with a plug 16 (e.g. page 3 lines 21-22);
applying at least one layer 13 to a surface 3 of the substrate 1, via a low-temperature coating process (e.g. page 3 lines 24-26); and
irradiating a near-surface region 15 of the coating layer 13 to improve adhesion of the coating layer 13 to the substrate 1, and to ensure homogenization of the coating layer 13 (e.g. page 4 line 31 to page 5 line 3) and without homogenizing a region of the substrate 1 located laterally adjacent the homogenized region (e.g. figures 1c and 1d).

Dependant Claim 16:

Referring to Figure 1, dependant claim 16 recites a method according to claim 1, wherein the near-surface region 15 of the coating layer 13 is scanned over a period of time by the irradiation (e.g. page 4 line 31 to page 5 line 9, and figure 1c).

Dependant Claim 17:

Referring to Figure 1, dependant claim 17 recites a method according to claim 5, wherein the temperature for the low-temperature coating process is below 100°C (e.g. page 4 lines 13-15).

Dependant Claim 18:

Referring to Figure 1, dependant claim 18 recites a method according to claim 17, wherein the temperature for the low-temperature coating process is 50°C (e.g. page 4 lines 13-15).

Grounds for Rejection to be Reviewed on Appeal

Whether claims 1-2, 4-14 and 16-18 are unpatentable under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement.

Appellant's Argument

Independent claims 1, 13 and 14:

Independent claims 1, 13 and 14 stands rejected under 35 U.S.C. 112, first paragraph as failing to comply with the written description requirement for containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors had possession of the claimed invention at the time the application was filed.

In Claims 1, 13 and 14 the Examiner has indicated that the claim limitation "without melting and homogenizing a region of the substrate located laterally adjacent the homogenized region" is new matter. Applicants respectfully submit that the Examiner has committed error.

THE EXAMINER HAS COMMITTED ERROR BY DISREGARDING THE
REQUIREMENTS OF MPEP § 2173.05(i)

MPEP 2173.05(i) states "Any negative limitation or exclusionary proviso must have basis in the original disclosure" and "a lack of literal basis in the specification for a negative limitation may not be sufficient to establish a *prima facie* case for lack of descriptive support."

Applicants submit that the original disclosure and Figures 1a-d provide sufficient basis for the above identified claim limitation. Specifically, the original disclosure discusses homogenizing near-surface coating particles (Spec. p. 2, lines 16-20 and p. 5 lines 1-2) and Figure 1c shows the combined substrate **1**, layer **13** and irradiation device **19** during the irradiation process step. The representation of the layer surface **15** shows an irregular surface profile and a non-irregular substrate surface **3** profile. Figure 1d shows the combined substrate **1** and layer **13** **after** the irradiation process step where the layer surface is represented as **a non-irregular surface** which graphically represents the disclosed "homogenization in the near-surface region" (e.g. page 5 lines 1-2). Importantly, the substrate is represented identically in all of figures 1a-d thereby showing that "melting and homogenizing a region of the substrate located laterally adjacent the homogenized region" has not occurred.

Applicants rely upon figures 1c and 1d, which are part of the originally filed specification. As such, the above claim limitation is sufficiently supported in the original disclosure and is therefore not new matter.

The Examiner has stated that “the structure disclosed in the specification is a ‘corresponding’ structure in the claims only if the specification or prosecution history clearly links or associates that structure to the function recited” citing MPEP § 2163.02 and 2181(IV). Applicants submit that MPEP § 2181(IV) addresses Means-Plus-Function claim language as related to a 35 U.S.C. 112, sixth paragraph rejection and since the claims at issue do not include Means-Plus-Function claim language the Examiners argument is not appropriate.

THE EXAMINER HAS COMMITTED ERROR BY DISREGARDING THE
REQUIREMENTS OF MPEP § 2161.01(III)

MPEP § 2161.01(III) provides the Examiner “must establish on the record a reasonable basis for questioning the adequacy of the disclosure to enable a person of ordinary skill in the art to make and use the claimed invention without resorting to undue experimentation,” citing in re Brown, 477 F.2d 946, 177 USPQ 691 (CCPA 1973); In re Ghiron, 442 F.2d 985, 169 USPQ 723 (CCPA 1971).

The Examiner contends that a skilled artisan would need to resort to undue experimentation to make and use the claimed invention because “fusing” is broadly recited in Applicants specification and “...does not negate fusing the coating layer and the substrate, where this would have improved adhesion of the coating to the substrate.” Applicants submit tat the original disclosure merely uses the term “fusing” in its ordinary sense which is well understood technical term. Applicants submit that MPEP 2164.05(a) states “the specification need not disclose what is well-known to those skilled in the art and preferably omits that which is well-known to those skilled and already available to the public.” Moreover, Applicants specification teaches that the coating layer is applied by a low temperature electrochemical processes below 250°C (e.g. page 4 lines 11-15), and that the coating layer **13** requires post treatment of the near surface **15** by irradiation that results in the near surface 15 being fused (e.g. page 4 line 31-page 5 lines 4). Applicants respectfully submit that Applicants specification discloses only fusing the near surface region **15** of the coating layer **13** which is distinct and separate from fusing between the coating layer **13** and the substrate material **1** as interpreted by the Examiner.

THE EXAMINER HAS COMMITTED ERROR BY DISREGARDING THE
REQUIREMENTS OF MPEP §§ 2163 and 2163.04

MPEP 2163 provides that “there is a strong presumption that an adequate written description of the claimed invention is present in the specification as filed,” citing Wertheim, 541 F.2d at 262, 191 USPQ at 96.

Moreover, MPEP 2163.04 requires that:

In rejecting a claim, the examiner must set forth express findings of fact which support the lack of written description conclusion (see MPEP § 2163 for examination guidelines pertaining to the written description requirement). These findings should:

- (A) Identify the claim limitation at issue; and
- (B) Establish a *prima facie* case by providing reasons why a person skilled in the art at the time the application was filed would not have recognized that the inventor was in possession of the invention as claimed in view of the disclosure of the application as filed.... When appropriate, suggest amendments to the claims which can be supported by the application’s written description, being mindful of the prohibition against the addition of new matter in the claims or description.

Applicants respectfully submit that the Examiner has a very difficult burden to make and maintain a 35 U.S.C. § 112, para. 1 rejection. Since the Examiner has failed to provide sufficient reasons why a person skilled in the art at the time the application was filed would not have recognized that the inventor was in possession of the above identified inventive concepts and also has not shown why such skilled artisan would need to resort to undue experimentation to make and use the claimed invention, the Examiner has failed to meet the requirements of MPEP 2163.04.

Dependant Claims 2, 4-12 and 16-18:

For the reasons provided above regarding claims 1, 13 and 14, the Examiners §112, first paragraph rejection is improper and must fail.

Conclusion

For the foregoing reasons, it is respectfully submitted that the rejections set forth in the Final Office Action are inapplicable to the pending claims. The honorable Board is therefore respectfully requested to reverse the final rejection of the Examiner and to remand the application to the Examiner with instructions to allow the pending claims. Please grant any extensions of time required to enter this paper. Please charge any appropriate fees due in connection with this paper or credit any overpayments to Deposit Account No. 19-2179.

Respectfully submitted,

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Claims Appendix

1. A method for coating a substrate having at least one hole, comprising:
covering the at least one hole with a plug;
applying at least one layer to a surface of the substrate via a low-temperature coating process; and
irradiating a near-surface region of the coating layer to improve adhesion of the coating layer to the substrate, and to ensure homogenization of the coating layer without homogenizing a region of the substrate located laterally adjacent the homogenized region.
2. A method according to Claim 1, wherein the substrate is a turbine blade.
3. (cancelled).
4. A method according to Claim 1, wherein the low-temperature coating process is an electrochemical coating method.
5. A method according to Claim 1, wherein the temperature for the low-temperature coating process is below 250°C.
6. A method according to Claim 1, wherein irradiation of the near-surface region is performed using pulsed electron irradiation.
7. A method according to Claim 1, wherein irradiation of the near-surface region is performed using a laser treatment.
8. A method according to Claim 1, wherein during or at the end of irradiation of the near-surface region, the plug is removed from the near-surface region of the hole.
9. A method according to Claim 8, wherein the plug is removed by evaporation.

10. A method according to Claim 1, wherein the coating layer is a ceramic heat insulating layer, or an MCrAlY coating where M is selected from the group consisting of iron, cobalt and nickel.

11. A method according to Claim 1, wherein the hole, of which there is at least one, is a film cooling hole or an impingement cooling hole.

12. A method according to Claim 1, wherein the plug is a wax material.

13. A method for coating a turbine component having at least one hole, comprising:
covering the at least one hole with a plug;
applying at least one layer to a surface of the turbine component via a low-temperature coating process; and
irradiating a near-surface region of the coating layer to improve adhesion of the coating layer to the surface of the component, and to ensure homogenization of the coating layer and without homogenizing a region of the surface of the turbine component located laterally adjacent the homogenized region.

14. A method for recoating a substrate, which has already been used and having at least one hole, comprising:

covering the at least one hole with a plug;
applying at least one layer to a surface of the substrate, via a low-temperature coating process; and

irradiating a near-surface region of the coating layer to improve adhesion of the coating layer to the substrate, and to ensure homogenization of the coating layer and without homogenizing a region of the substrate located laterally adjacent the homogenized region.

15. (cancelled).

16. The method according to Claim 1, wherein the near-surface region of the coating layer is scanned over a period of time by the irradiation.

17. The method according to Claim 5, wherein the temperature for the low-temperature coating process is below 100°C.

18. The method according to Claim 17, wherein the temperature for the low-temperature coating process is 50°C.

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Evidence Appendix

None

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Related Proceedings Appendix

None